IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
Before the Board of Patent Appeals and Interferences

APPLICANT:	CALCEV ET AL	EXAMINER:	SOL
SERIAL NO.:	10/603,558	GROUP:	2619
FILED:	06/25/2003	CASE NO.:	CML01204M
TITLED:	METHOD AND APPARATUS FOR ROUTE DISCOVERY WITHIN A COMMUNICATION SYSTEM		

Motorola, Inc.
Corporate Offices
1303 E. Algonquin Road
Schaumburg, IL 60196
November 13, 2007

SUPPLEMENTAL APPEAL BRIEF FOR APPELLANT
UNDER 37 C.F.R. §1.191

Assistant Commissioner for Patents and Trademarks
Washington DC, 20231

1. REAL PARTY IN INTEREST

The real party in interest in this appeal is Motorola, Inc.

2. RELATED APPEALS AND INTERFERENCES

There are no other appeals or interferences that will directly affect, or be directly affected by, or have a bearing on the Board's decision in this appeal.

3. STATUS OF CLAIMS

- This is an appeal from the final rejection mailed 10 October 2007.
- Claims 1-6, 9, 10, and 13-18 are the appealed claims.
- Claims 6-8, 10, 11, 17, and 18 were rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,704,293 B1 ("Larsson").
- Claims 1-5, 9, 12-13, 15 and 16 were rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,704,293 B1 ("Larsson") in view of U.S. Patent No. 6,304,556 B1 ("Haas").
- Claims 7-8, and 11-12 were cancelled.
- The claims are reproduced below in APPENDIX 1.

4. STATUS OF AMENDMENTS

No amendments have been filed subsequent to this Appeal.

5. SUMMARY OF CLAIMED SUBJECT MATTER

In order for one node within an ad-hoc communication system to communicate with another node in the ad-hoc communication system, a route must be "discovered" between the two nodes. This route will typically pass through intervening nodes that will relay the communications between the two nodes. During prior-art route discovery, a message flooding procedure occurs that is often the basis of on-demand route discovery and network initialization. Message flooding is basically defined as a broadcast procedure covering a complete network. It operates as follows: When a node, or remote unit, in a network wishes to discover a route to another node in the network a message is broadcasted to all of its neighbors specifying the destination address. Upon receiving the message, all of the neighboring nodes will rebroadcast the message to their neighbors.

When a node receives the same message again, it discards it. The procedure repeats itself until all of the nodes in the network are reached, or a time-to-live for the message expires. As discussed, the purpose to flood the network in a routing algorithm is essentially to find a path to send data to destinations. The message content is usually a request of route discovery.

Although message flooding is a dependable way to find a route within the network, flooding is proven to generate excessive amounts of system traffic and interference. To address this issue, the present invention provides for an ***overlay*** communication system that aides in determining a route between nodes in an ***underlay*** communication system. In particular, when a first node wishes to discover a route to a second node, the first node notifies an overlay communication system, which notifies all nodes in the underlay communication system of the desire. Both the first and the second nodes begin flooding the underlay system simultaneously. When a node in the underlay system hears both the flood messages from the first and the second node, the overlay communication system is notified and stops all flooding. The route information is then provided to the first and the second nodes via the overlay communication system.

Because flooding takes place simultaneously from two nodes within the underlay communication system, the search will reduce the amount of signaling in half for a uniform distribution of the ad hoc nodes. This will equate into a less interference in the ad hoc network and less battery drain. A second advantage of the disclosure is the reduction of discovery time. If the search is unidirectional the expected time to discover the route is the time that a flood message reaches the target plus the time that the acknowledgement reaches the source. In the preferred embodiment of the present invention this time is cut in half since the message and the acknowledgement have to parse half of nodes than in the actual algorithms.

In claim 1, a method for route discovery is provided. The method comprises the steps of:

- determining that a first node needs to communicate with a second node (Page 8, lines 20-21), wherein the first and the second nodes are part of an underlay communication system (FIG. 1);
- sending, by the first node, a message to an overlay communication system notifying the overlay communication system of the need to communicate with the second node (Page 10, lines 21-24);
- receiving by the first node, from the overlay communication system, instructions to broadcast a route-discovery message (Page 10, lines 24-26);

- broadcasting the route discovery message within the underlay communication system (Page 10, lines 27-29); and
- receiving by the first node route information from the overlay communication system (Page 10, lines 31 to Page 11, line 1).

Claim 4 recites a method comprising the steps

- receiving, by a first node, from an overlay communication system, a message instructing the first node to broadcast a route discovery message (Page 9, lines 18-19), wherein the first node exists within an underlay communication system (FIG. 1); and
- broadcasting the route discovery message within the underlay communication system (Page 9, lines 20-21).

Claim 6 recites a method for operating a node within an underlay communication system. The method comprises the steps of:

- receiving a route-discovery message from a first node, wherein the first node is part of an underlay communication system (Page 11, lines 9-10);
- receiving a route-discovery message from a second node, wherein the second node is part of the underlay communication system (Page 11, lines 10-11);
- determining route information based on the route-discovery messages (Page 11, lines 16-17); and
- transmitting the route information through an overlay communication system to the first node (Page 11, lines 18-19).

Claim 10 recites a method comprising the steps of:

- receiving at a base station in an overlay communication system, a message from a first node in an underlay communication system, the message indicating a need to discover a route to a second node (Page 12, lines 3-6);
- broadcasting by the base station, a message to nodes within the underlay communication system, the message instructing the nodes to monitor for flood messages from the first and the second nodes (Page 12, lines 6-8);
- receiving by the base station a message from a third node in an underlay communication system, the message comprising route information (Page 12, lines 12-13); and
- transmitting by the base station, the route information to the first node (Page 12, lines 14-15).

Claim 15 provides for an apparatus comprising:

- means (logic circuitry 701) for determining that a first node needs to communicate with a second node(Page 8, lines 20-21), wherein the first and the second nodes are part of an underlay communication system (FIG. 1);
- means for sending (transmitter 703), by the first node, a message to an overlay communication system notifying the overlay communication system of the need to communicate with the second node (Page 10, lines 21-24);
- means for receiving (receiver 702) by the first node, from the overlay communication system, instructions to broadcast a route-discovery message (Page 10, lines 24-26);
- means for broadcasting (transmitter 703) by the first node, the route discovery message (Page 10, lines 27-29); and
- means for receiving (receiver 702) by the first node route information from the overlay communication system (Page 10, lines 31 to Page 11, line 1).

Claim 16 provides for an apparatus comprising:

- means for receiving (receiver 702) by a first node, from an overlay communication system, a message instructing the first node to broadcast a route discovery message (Page 9, lines 18-19), wherein the first node exists within an underlay communication system (FIG. 1); and
- means for broadcasting (transmitter 703) the route discovery message within the underlay communication system (Page 9, lines 20-21).

Claim 17 provides for an apparatus comprising:

- means for receiving (receiver 702) a route-discovery message from a first node, wherein the first node is part of an underlay communication system (Page 11, lines 9-10);
- means for receiving (receiver 702) a route-discovery message from a second node, wherein the second node is part of the underlay communication system (Page 11, lines 10-11);
- means for determining (logic circuitry 701) route information based on the route-discovery messages(Page 11, lines 16-17); and
- means for transmitting (transmitter 703) the route information through an overlay communication system to the first and the second nodes (Page 11, lines 18-19).

Finally, claim 18 provided for an apparatus comprising:

- means for receiving (receiver 702) at a base station in an overlay communication system, a message from a first node in an underlay communication system, the message indicating a need to discover a route to a second node (Page 12, lines 3-6);

- means for broadcasting (transmitter 703) by the base station, a message to nodes within the underlay communication system, the message instructing the nodes to monitor for flood messages from the first and the second nodes (Page 12, lines 6-8);
- means for receiving (receiver 702) by the base station a message from a third node in an underlay communication system, the message comprising route information (Page 12, lines 12-13); and
- means for transmitting (transmitter 703) by the base station the route information to the first node (Page 12, lines 14-15).

6. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The grounds of rejection to be reviewed on appeal will be:

- The rejection of claims 6-8, 10, 11, 17, and 18 under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,704,293 B1 ("Larsson"); and
- The rejection of claims 1-5, 9, 12-13, 15 and 16 under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,704,293 B1 ("Larsson") in view of U.S. Patent No. 6,304,556 B1 ("Haas").

7. ARGUMENT

(i) *Rejections under 35 USC 112 first paragraph:*

None

(ii) *Rejections under 35 USC 112, second paragraph:*

None

(iii) *Rejections under 35 USC §102:*

Claims 6-8, 10, 11, 17, and 18 were rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,704,293 B1 ("Larsson").

The present invention provides for an ***overlay*** communication system that aides in determining a route between nodes in an underlay communication system. Claims 6-8, 10, 11, 17, and 18 all contain limitations using the term "***overlay*** communication system". In rejecting claims 6-8, 10, 11, 17, and 18, Examiner Sol fails to give "overlay communication system" its plain meaning as known in the art, and is reading the term in a vacuum.

Analysis of Larsson reveals that Larsson teaches route discovery ***within a single communication system.*** Particularly, Larsson reveals a method to piggyback broadcast messages together to reduce the overhead and the broadcast traffic. In rejecting the Applicants' claims, Examiner Sol states that the ad-hoc network as disclosed by Larsson meets the limitation of the claimed underlay communication system (Page 3) and that the ***network adaptation layer*** meets the limitation of an ***overlay communication system*** as claimed (Page 4). It is inconceivable to the Applicants how a network adaptation layer can possibly be equated to a communication system. In equating a network adaptation layer with an overlay communication system, Examiner Sol fails to give the term "overlay communication system" its plain meaning as known in the art, and is reading the term in a vacuum.

Words of a Claim Must be Given Their Plain Meaning Unless They are Defined in the Specification

As stated in MPEP 2111.01, the words of a claim must be given their plain meaning unless they are defined in the specification. When not defined within the specification, MPEP 2111.01 states that the words of the claim "must be read as they would be interpreted ***by those of ordinary skill in the art***". (MPEP 2111.01, emphasis added). As stated in MPEP 2111.01, "[t]his means that the words of the claim must be given their plain meaning unless applicant has provided a clear definition in the specification."

In this case, the ordinary meaning of claim language as understood by a person of skill in the art may be readily apparent even to lay persons. Claim construction in these cases involves little more than the application of the ***widely accepted meaning of commonly understood words***. See Brown v. 3M, 265 F.3d 1349, 1352 (Fed Cir. 2001) (holding that the claims did "not require elaborate interpretation").

The term overlay and underlay communication system is a term that is extremely common in the art, with literally dozens of US patents and IEEE publications using the term exactly how it is meant by the Applicants. More particularly, those skilled in the art

will without a doubt recognize an "overlay communication system" to be a wireless communication system that overlaps in space and some times in frequency with the underlay wireless system. Some publications utilizing the term "overlay", which is emphasized, are reproduced below:

> This technique uses a 10 MHz Broadband- CDMA (B-CDMA) signal which spreads over the entire contiguous bands A or B, leaving the extended bands for AMPS alone. The B-CDMA ***Overlay*** does not require displacing any AMPS users. Instead it uses a combination of broadband DS-SS along with agile receive and transmit notch filtering at the base station to cohabitate the same spectrum used by the AMPS service. By this technique, a significant increase in capacity can be realized. The capacity of broadband CDMA overlaying a GSM cellular system. Grieco, D.M.; Schilling, D.L.; Vehicular Technology Conference, 1994 IEEE 44th 8-10 June 1994 Page(s):31 - 35 vol.1.

> "One possible way to make this transition is to employ CDMA ***overlay***, in which a CDMA cellular system would be implemented in a frequency band which is dedicated to a narrowband cellular system". Multicarrier CDMA for cellular overlay systems, Rainbolt, B.J.; Miller, S.L.; Selected Areas in Communications, IEEE Journal on Volume 17, Issue 10, Oct. 1999 Page(s):1807 – 1814.

> With the expected wireless revolution in telecommunications, the available spectrum should be used efficiently and flexibly. One step in this direction is the use of SS ***overlay***. Spectrum spreading allows overlaying signals on frequency bands which are already occupied by narrow-band users without influencing these in a considerable way . . . . "A CDMA overlay system using frequency-diversity spread spectrum" Papproth, E.; Kawas Kaleh, G.; Vehicular Technology, IEEE Transactions on Volume 48, Issue 2, March 1999 Page(s):397 – 404.

> In this paper, we design a system with an ad hoc ***overlay*** network, which we denote as the secondary system (SEC), to efficiently utilize the bandwidth left unused in a cellular system, which we denote as the primary system (PRI). Enhancing wireless spectrum utilization with a cellular-ad hoc overlay architecture Sankaranarayanan, S.; Papadimitratos, P.; Mishra, A.; Military

Communications Conference, 2005. MILCOM 2005. IEEE 17-20 Oct. 2005 Page(s):405 - 412 Vol. 1

A multiple mode, personal, wireless communications system is disclosed which exists within a radiotelephone network serving general customers and provides unique additional services to a select group of customers equipped with special handsets, without impacting the general customers. The special handsets automatically switch between and operate in either analog or digital mode with the standard radiotelephone network and in an enhanced cordless mode when within range of independent pico cells, that are interconnected with the public switched telephone network. Each of the network transparent pico cells is controlled via a framework of ***overlay*** cells that operate independently of the radiotelephone network and use a unique control protocol on a relatively small number of reserved channels, with a use hierarchy that is reversed with respect to standard radiotelephone channels. US6526277 B1

A cellular communication system has a frequency bandwidth arranged into a plurality of frequency channels, and a plurality of neighbouring first (130) and second (132) sites each having sectors (a1-f1, a2-f2) containing at least one frequency channel. Corresponding sectors in each of the neighbouring first (130) and second sites (132) have consecutive frequency channels from the frequency bandwidth, thereby producing a two-site re-use pattern (134, 136). The cellular communication system may be adapted to support an underlay/***overlay*** cell configuration in which neighbouring first (230) and second (232) sites each have six-sectors containing at least one frequency channel (b1-b12) of a two-site repeat pattern. The six sectors further each contain at least one frequency channel (t1-t6) of a one-site repeat pattern. Corresponding sectors in each of the neighbouring first (130) and second sites (132) have consecutive frequency channels in the two-site repeat pattern and identical channels in the one-side repeat pattern. EP867100B

Therefore, because the term "overlay communication system" must be given its plain meaning, and because the term "overlay communication system" is readily apparent (even to lay persons), claim construction involves little more than the application of the widely accepted meaning of "overlay communication system" to the

claim. Therefore, Examiner Sol's equating a network adaptation layer to a communication system is improper.

Claims are not to be Read in a Vacuum, and Limitations Therein are to be Interpreted in Light of the Specification

The person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification. The court explained that point well in Multiform Desiccants, Inc. v. Medzam, Ltd., 133 F.3d 1473, 1477 (Fed. Cir. 1998). See also Medrad, Inc. v. MRI Devices Corp., 401 F.3d 1313, 1319 (Fed. Cir. 2005) ("We cannot look at the ordinary meaning of the term . . . in a vacuum. Rather, we must look at the ordinary meaning in the context of the written description and the prosecution history.")

Clearly, the Applicants' specification and drawing support the above-defined meaning of the term "overlay communication system" since two communication systems are clearly defined in FIG. 1, and every use of the term "overlay communication system" conforms with the commonly-held meaning of the term. Therefore claim construction involves little more than the application of the widely accepted meaning of "overlay communication system" to the claim.

When the term "Overlay Communication System" is Not Read in a Vacuum, and Given its Plain Meaning, Claims 6-8, 10, 11, 17, and 18 are not Anticipated by Larsson.

When the term "overlay communication system" is not read in a vacuum, and given its plain meaning, claims 6-8, 10, 11, 17, and 18 are not anticipated by Larsson. Analysis of Larsson reveals that this reference teaches a method to piggyback broadcast messages together to reduce the overhead and the broadcast traffic. Larsson fails to teach or otherwise suggest that an overlay communication system can be used by nodes in an underlay communication system to transmit route information. In fact, the term ***overlay or underlay aren't even mentioned by Larsson.*** Because of this, claims 6-8, 10, 11, 17, and 18 are in proper condition for allowance.

(iv) *Rejections under 35 USC §103(a):*

Claims 1-5, 9, 12-13, 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,704,293 B1 ("Larsson") in view of U.S. Patent No. 6,304,556 B1 ("Haas"). These claims include the limitations that an overlay communication system aids an underlay communication system in route discovery. Here again Examiner Sol states that the network adaptation layer of Larsson meets the limitation of an overlay communication system as claimed. Again, it is inconceivable to the Applicants how a network adaptation layer can possibly be equated to a communication system. For the reasons stated above, Examiner Sol fails to give the term "overlay communication system" its plain meaning, and is reading the term in a vacuum.

When the term "overlay communication system" is not read in a vacuum, and given its plain meaning, claims 1-5, 9, 12-13, 15 and 16 are not made obvious by the combination of Larsson and Haas. In particular, claims 1 and 15 specifically state that the first and the second nodes are part of an underlay ad-hoc communication system, and that route information is received from an overlay communication system. As stated above, when the term "overlay communication system" is not read in a vacuum, and given its plain meaning, Larsson fails to teach or otherwise suggest that an overlay communication system can aide an underlay communication system with route discovery. Additionally, Haas fails to teach or otherwise suggest this limitation as well. Because of this, claims 1and 15 are allowable over the prior art of record.

Regarding independent claims 4 and 16, these claims specifically have the limitation that a node in an underlay communication system receives a message from an overlay communication system to begin broadcasting route discovery messages within the underlay communication system. As discussed above, Larsson teaches a method to piggyback broadcast messages together to reduce the overhead and the broadcast traffic. The Examiner states that Haas teaches a cellular communication system, however, the only discussion about cellular systems is the fact that ad hoc networks are different than cellular networks since there are no centralized entities in an ad hoc network (col. 2). Therefore, there is no disclosure from Larson or Haas of receiving from an overlay communication system instruction to broadcast a route discovery message.

Regarding all other claims, since these claims depend from allowable base claims, all other claims are in proper condition for allowance.

(i) *Further Rejections:*

None

CONCLUSION

In summary, all claims have the term "overlay communication system". This feature is neither taught nor suggested by the prior art. Examiner Sol refuses to give this term its plain meaning as known in the art, and is reading the term in a vacuum, stating that the network adaptation layer of Larsson meets the limitation of an overlay communication system as claimed. The Applicants point out that it is a mistake for Examiner Sol to read the term in a vacuum and not give this term its plain meaning as known in the art. The courts have consistently held that:

- words of a claim must be given their plain meaning unless they are defined in the specification;
- the claims are not to be read in a vacuum; and
- limitations therein are to be interpreted in light of the specification.

Because of this, Examiner Sol must interpret "overlay communication system" as it is meant to be interpreted in the Applicants specification. Once the proper definition for "overlay communication" is taken into consideration, it is clear that all claims are allowable over the prior art of record.

Respectfully Submitted,
CALCEV, ET AL.

by: /Kenneth Haas/
Kenneth A. Haas
Attorney for Applicant
Reg. No. 42,614
Phone: (847) 576-6937
FAX: (847) 576-3750

CLAIMS APPENDIX

S/N 10/603,558
Filed: 06/25/2003

1. (Previously Amended) A method for route discovery, the method comprising the steps of:

determining that a first node needs to communicate with a second node, wherein the first and the second nodes are part of an underlay ad-hoc communication system;

sending, by the first node, a message to an overlay communication system notifying the overlay communication system of the need to communicate with the second node;

receiving by the first node, from the overlay communication system, instructions to broadcast a route-discovery message;

broadcasting the route discovery message within the underlay communication system; and

receiving by the first node route information from the overlay communication system.

2. (Original) The method of claim 1 wherein the step of sending the message to the overlay communication system comprises the step of sending the message to a cellular communication system.

3. (Original) The method of claim 1 wherein the step of receiving route information comprises the step of receiving a sequenced list of IP addresses.

4. (Previously Amended) A method comprising the steps of:

receiving, by a first node, from an overlay communication system, a message instructing the first node to broadcast a route discovery message, wherein the first node exists within an underlay communication system; and

broadcasting the route discovery message within the underlay communication system.

5. (Original) The method of claim 4 wherein the step of receiving from the overlay communication system comprises the step of receiving from a cellular communication system.

6. (Previously Amended) A method for operating a node within an underlay communication system, the method comprising the steps of:

receiving a route-discovery message from a first node, wherein the first node is part of an underlay communication system;

receiving a route-discovery message from a second node, wherein the second node is part of the underlay communication system;

determining route information based on the route-discovery messages; and

transmitting the route information through an overlay communication system to the first node.

7. (Cancelled).

8. (Cancelled).

9. (Original) The method of claim 6 wherein the step of transmitting the route information comprises the step of transmitting the route information through an overlay cellular communication system.

10. (Previously Amended) A method comprising the steps of:

receiving at a base station in an overlay communication system, a message from a first node in an underlay communication system, the message indicating a need to discover a route to a second node;

broadcasting by the base station, a message to nodes within the underlay communication system, the message instructing the nodes to monitor for flood messages from the first and the second nodes;

receiving by the base station a message from a third node in an underlay communication system, the message comprising route information; and

transmitting by the base station, the route information to the first node.

11. (Cancelled)

12. (Cancelled).

13. (Original) The method of claim 10 wherein the step of receiving the route information from the third node comprises the step of receiving a sequenced list of IP addresses from the third node.

14. (Previously Amended) The method of claim 10 further comprising the step of transmitting by the base station, a flood stop message causing nodes within the underlay communication system to cease transmission of flood messages.

15. (Previously Amended) An apparatus comprising:

means for determining that a first node needs to communicate with a second node, wherein the first and the second nodes are part of an underlay communication system;

means for sending, by the first node, a message to an overlay communication system notifying the overlay communication system of the need to communicate with the second node;

means for receiving by the first node, from the overlay communication system, instructions to broadcast a route-discovery message;

means for broadcasting by the first node, the route discovery message; and

means for receiving by the first node route information from the overlay communication system.

16. (Previously Amended) An apparatus comprising:

means for receiving, by a first node, from an overlay communication system, a message instructing the first node to broadcast a route discovery message, wherein the first node exists within an underlay communication system; and

means for broadcasting the route discovery message within the underlay communication system.

17. (Previously Amended) An apparatus comprising:

means for receiving a route-discovery message from a first node, wherein the first node is part of an underlay communication system;

means for receiving a route-discovery message from a second node, wherein the second node is part of the underlay communication system;

means for determining route information based on the route-discovery messages; and

means for transmitting the route information through an overlay communication system to the first and the second nodes.

18. (Previously Amended) An apparatus comprising:

means for receiving at a base station in an overlay communication system, a message from a first node in an underlay communication system, the message indicating a need to discover a route to a second node;

means for broadcasting by the base station, a message to nodes within the underlay communication system, the message instructing the nodes to monitor for flood messages from the first and the second nodes;

means for receiving by the base station a message from a third node in an underlay communication system, the message comprising route information; and

means for transmitting by the base station the route information to the first node.

RELATED PROCEEDINGS

None

EVIDENCE APPENDIX